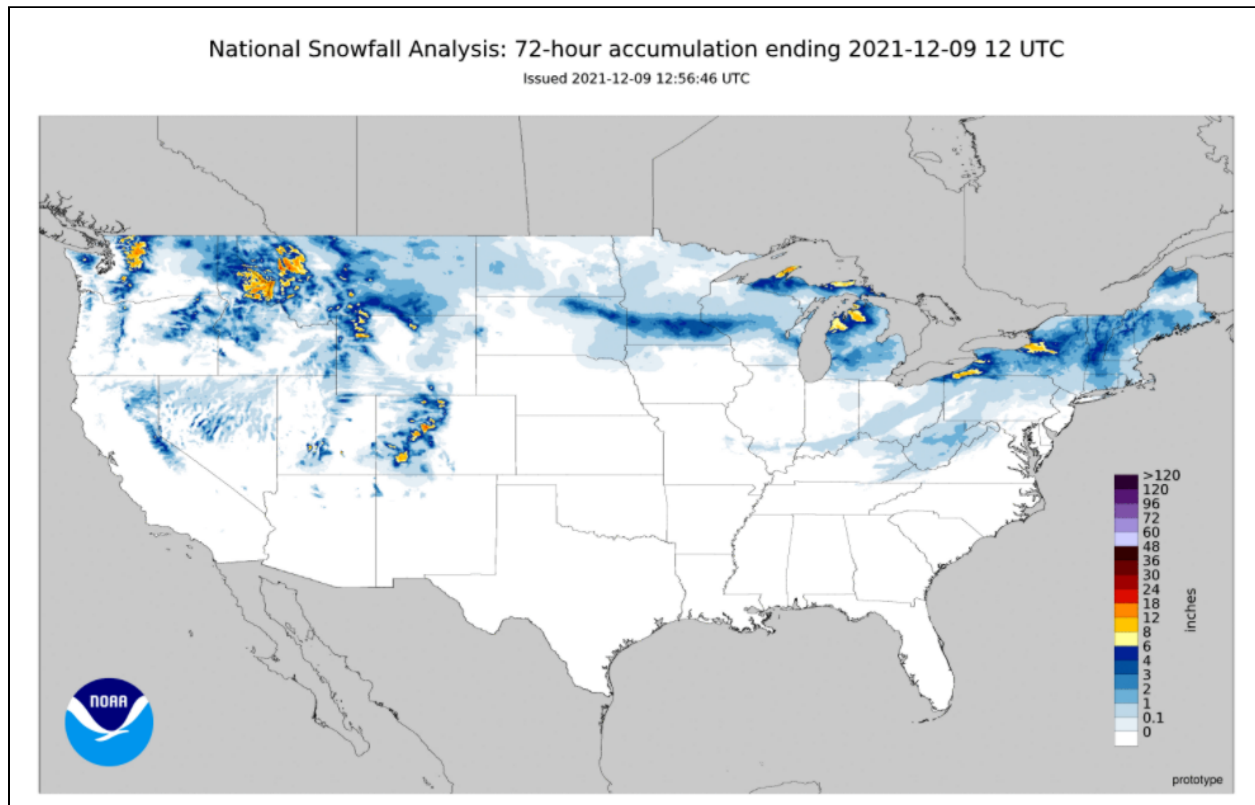


Product Description Document

Prototype National Snowfall Analysis

Updated: January 2022



Part 1 - Mission Connection

1. Product Description: The National Water Center (NWC) is the National Weather Service's (NWS's) center of expertise for national-scale hydrology. Hydrologic data includes Snow Water Equivalent (SWE), which can be derived from snowfall analyses. The NWC National Snowfall Analysis provides an accurate accounting of snowfall totals across the Nation that support the verification of snowfall forecasts and inform hydrologic assessments. The product provides 6-, 24-, 48-, and 72-hour snowfall accumulations in addition to a seasonal total which resets at the beginning of each water year (01 October).

2. Purpose/Intended Use: The National Snowfall Analysis provides a multiple-timestep analysis of snowfall totals across the conterminous United States. Currently, this product represents the only CONUS-wide snowfall accumulation data that assimilates observed snowfall data into a background analysis derived from quantitative precipitation estimates with additional guidance from modeled forecast data. This product enhances the NWS's ability to record snowfall accumulations in data sparse regions and areas where radar coverage is poor.

3. Audience/Users: NWS meteorologists and hydrologists, national and state partners/customers in water supply, flood and drought forecasting, and various private/public weather data vendors. The National Snowfall Analysis is used in forecast verification and inclusion in the Unrestricted Mesoscale Analysis.

4. Presentation Format: The National Snowfall Analysis is downloadable in multiple formats including stand-alone images, GIS-compliant datasets (GRIB2, NetCDF, projected NetCDF, GeoTiff), and as an interactive web map. National Snowfall Analysis is available every twelve hours representing accumulation in four timesteps:

6-Hour Accumulation

24-Hour Accumulation

48-Hour Accumulation

72-Hour Accumulation

Seasonal Accumulation (data resets on 01 Oct of every year)

5. Feedback Method: Comments and feedback will be provided through email to shawn.carter@noaa.gov.

Opportunities for face-to-face responses will occur routinely through normally scheduled National Water Center Region Snow Coordination Calls with RFCs, WFOs, and local, state, and federal partners.

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Part 2 - Technical Description

1. Format and Science Basis: The National Snowfall Analysis is generated by assimilating observations from Cooperative observers, Community Collaborative Rain, Hail and Snow Network observers and NWS spotter reports into a 24-hour background analysis based on Stage IV qualitative precipitation estimates, with contributions from High Resolution Rapid Refresh quantitative precipitation forecasts, the National Snow Analysis 2-meter air temperature grids, and a novel gridded snowfall-to-liquid ratio climatology. The program that generates the National Snowfall Analysis is repeated for up to 72 hours to capture any late reported snowfall reports and includes several automated and manual options for Quality Assurance on snowfall reports.

The 24-hour background analysis is conducted using High Resolution Rapid Refresh F003 snow:precipitation ratio, Stage IV QPE (when available), and a climatological snowfall to liquid

ratio (SLR) based on GHCN-D 1986-2015. GHCN-D snowfall and precipitation data from 1986-2015 was used to generate a snowfall-to-liquid ratio climatology and establish temperature thresholds for error detection and correction. Two assimilation passes using ordinary kriging are used with the first pass addressing the log-ratio of background to observed snowfall to correct biases and a second pass which addresses the first pass minus observed differences.

All assimilation kriging passes employ spherical semivariogram functions fitted to empirical semivariograms. The system incorporates automated quality control including data consistency and outlier checks during assimilation passes.

2. Training: No additional training is required to generate the product. Training for product use is incorporated in the Warning Operations Course - Winter Track in the lesson “Winter Weather Impacts”.

3. Availability: The National Snowfall Analysis is available 24/7 and updated every 12 hours (00 and 12 Coordinated Universal Time (UTC)).

The National Snowfall Analysis is available online. The website URL below is the current National Snowfall Analysis.

<https://www.nohrsc.noaa.gov/snowfall>

This Product Description Document is an update to the 2017 [Technical Implementation Notice](#).